CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 95-191

SITE CLEANUP REQUIREMENTS FOR:

CALIFORNIA AND HAWAIIAN (C&H) SUGAR COMPANY
C&H SUGAR WASTE MANAGEMENT UNIT
CROCKETT, CONTRA COSTA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board) finds that:

1. California and Hawaiian (C&H) Sugar Company (hereinafter called the discharger) owns and operates the C&H cane sugar refinery waste management unit (WMU, hereinafter called the facility). Since operation began in 1971, the facility has been operated solely by the discharger, and has received approximately 125,000 tons (dry weight), or approximately 200,000 cubic yards, of combined process sludge from the C&H cane sugar refinery and wastewater sludge from the Crockett/Valona Sanitary District Sewage Treatment Plant.

PURPOSE OF ORDER

2. C&H has discontinued operation of the facility and proposes its closure. This order establishes a set of requirements for closure of the facility. Closure activities will include the excavation and removal of sludge to the extent necessary to ensure that the site no longer has the potential to degrade water quality. The closure will proceed according to a specified time schedule.

SITE DESCRIPTION

3. The facility occupies 5.68 acres, out of a larger 1,300 acre parcel, in the northwestern side of the county, Township 2 North, Range 3 West, Section 8, Benicia 7.5 minute quadrangle, approximately 1.5 miles south of Carquinez Strait (Attachment 1). The facility is located on relatively steep topography at the head of a small canyon on Franklin Ridge. The facility is currently divided into two portions as follows:

   a. The modified-area fill portion of the facility is a 4.24 acre cell excavated approximately 12 feet into siltstone bedrock. This portion has a diameter of approximately 500 feet. Sludge has been off-loaded and spread across an unlined waste drying area during the rainy season in order to reduce moisture content through the evaporation process. Throughout the dry months, the sludge was deposited in piles within the perimeter of the WMU. Toward the end of the dry season, the sludge was moved from the off-loading area to the

active fill basin and subsequently compacted and graded with a track mounted bulldozer.

During periods of precipitation, storm water accumulated by gravity flow in an unlined drainage sump located between the active fill and the off-loading area. Sludge is present in the bottom of a channel leading directly from the sludge off-loading area to the sump. Storm water was removed from the sump at the earliest possible date a truck could drive up to the WMU, and then transported to the joint Crockett-Valona Sanitary District/C&H Sugar wastewater treatment plant.

b. The canyon fill portion of the facility occupies 1.4 acres at the head of Cañada del Cierbo, on the western side of the site. Sludge was deposited at the head of the canyon and allowed to settle across the canyon face from 1971 to 1977. No manipulation, tilling, compaction or covering was practiced. Depth of fill is estimated to be approximately 90 feet at the top of the ravine at the head of Cañada del Cierbo. The surface slope horizontal to vertical ratio is approximately 1.6:1 (32 degrees). A compacted soil berm approximately nine feet in height contains the waste fill within the ravine. A pipe constructed in the containment berm drains surface water that has accumulated behind the berm after a rainfall event. Water from this drainage pipe discharges into the stream at the bottom of Cañada del Cierbo.

5. Before construction of the containment berm at the toe of the inactive fill area, some waste was transported into Cañada del Cierbo. According to the Report of Waste Discharge (ROWD) dated January, 1989, waste is present in the form of levees along the margins of the canyon in its upper reaches.

6. Drainage in the immediate vicinity of the C&H WMU consists largely of slope wash due to the WMU's topographic location which approaches the highest elevation in the immediate area. Runoff north of Cummings Skyway is diverted to the north of this thoroughfare which roughly coincides with a natural drainage divide. Runoff to the south of Cummings Skyway, in the vicinity of the WMU, is diverted into Cañada del Cierbo as slope wash.

7. As of April 10, 1995, the facility discontinued receiving waste. All sugar processing sludge currently generated at the refinery is diverted to Triad Energy Resources, Inc. in Modesto, California. On August 20, 1995, C&H signed a contract with Triad to excavate and remove waste material currently in the WMU in preparation for final closure of the facility.

are putrescible and subject to anaerobic decomposition processes.

14. A modified Waste Extraction Test (WET) to characterize soluble pollutants in the primary sludge was performed in February, 1994.

    a. Leachable extract from the WET showed a pH of 11, which is in the caustically alkaline range of the pH scale.

    b. High biochemical oxygen demand (BOD) values (260-300 mg/l) were also measured in the primary sludge extract.

    c. Total dissolved solids (TDS) were present in the primary sludge extract at concentrations of 670-690 mg/l. The most prevalent salt in the primary sludge is calcium phosphate found in bone char dust and also formed by flocculating lime and phosphoric acid in the refinery process.

GEOLOGIC SETTING

15. The C&H WMU is nestled within a series of hills in the Diablo Range of the Coast Range Geomorphic Province. The Diablo Range is a northwest-trending range of mountains bounded on the southwest by the faults of the San Andreas fault system, and on the northeast by the structurally downwarped San Joaquin Valley. In general, the Diablo Range consists of a central core of mesozoic Franciscan rocks bounded along a structural discontinuity with Mesozoic Great Valley sequence rocks and overlying Cenozoic strata.

16. The ROWD states that the Franklin thrust fault, which strikes northwest-southeast, occurs approximately 500 feet to the northeast of the WMU. Fault investigations have not been performed or required due to intent to remove wastes from the site.

17. The rocks to the northeast of the Franklin fault are composed of the cretaceous Chico Formation which consists primarily of claystones, siltstones, and sandstones. The rocks to the southwest of the fault are composed of shales and mudstones of the Miocene-age Monterey formation in stratigraphic contact with massive siltstone and claystone which include a few thin sandstone beds.

Soils

18. Based on information collected during the ROWD site investigation, the C&H WMU is underlain by a thin blanket of soil and weathered rock of approximately three to ten feet in thickness on top of low permeability fractured bedrock. Soils are typically

8. On March 29, 1995, the California Department of Food and Agriculture issued a Fertilizing Materials License for sale of C&H refinery process sludge as an agricultural mineral. The determination that the refinery process sludge is suitable for use as a soil amendment is based on analytical results of samples of the material collected from the WMU and from currently produced filter cake.

WASTES AND THEIR CHARACTERISTICS

9. This facility has received both sugar refining process sludge (primary sludge) and sludge from the wastewater treatment plant (secondary sludge). As of January 15, 1993, the discharger ceased disposal of the secondary sludge, and as of April 10, 1995, ceased disposal of primary sludge at this facility.

10. Primary sludge: The primary sludge disposed of at this facility consists of dewatered solids from the primary treatment of C&H sugar refining wastewater. The sludge primarily consists of diatomaceous earth (filter aid), bone char dust from bone char washing, calcium phosphate salt from lime and phosphoric acid usage, and small quantities of organic wastes consisting of sugar and polysaccharide residues from raw sugar. Prior to transportation and disposal at the WMU, the discharger dewaters the sludge by means of a rotary vacuum filter. Upon discharge from the refinery, dewatered primary sludge is reported to have a moisture content of approximately 60 to 75 percent. Average daily generation of this sludge ranges from 36 to 48 tons (wet weight).

11. The 1989 ROWD described the sludge as, "a dark gray, wet, and slightly plastic material from which liquids drain under vibration." During a site visit on September 12, 1994, Regional Board staff observed liquid draining from primary sludge recently unloaded onto the unlined waste drying area.

12. Secondary sludge: The secondary sludge discharged to the site consisted of dewatered activated sludge solids generated by the joint C&H Sugar Company - Crockett/Valona secondary wastewater treatment plant. This sludge was composed primarily of organic matter (microbial cell mass) and contained between 18 and 25 percent solids with a neutral pH. This sludge was discharged into this facility from 1978 to January 1993. C&H representatives estimate that this sludge composes approximately 5 percent of the solids in the WMU.

13. The results of an Air Quality SWAT conducted in April of 1988 identified the existence of methane within the active WMU area. One gas sample collected from the interior of the WMU at a depth of 7.5 feet contained 25 percent methane. The presence of methane indicates that some portion of the wastes discharged to the WMU

classified as silt, ranging from a dark yellowish orange silt, with light gray motling and no plasticity, to a stiff dusky-yellow, clayey silt of low plasticity. One of the borings drilled in the canyon fill encountered silty sandy gravel between 14 feet and the boring terminus at 30 feet. The gravel materials consisted of siltstone fragments, with varying degrees of weathering, in a silty matrix, possibly indicating colluvial (landslide) deposition. In the modified-area fill portion of the WMU, two borings completed to approximately 20 feet below ground surface encountered siltstone immediately below the sludge fill at a depth of 15 feet. Fine fractures in the bedrock appeared to be filled with the sludge.

HYDROGEOLOGIC SETTING

19. The site is located in an area of regional groundwater recharge in a topographically upgradient area. The regional groundwater discharge area for groundwater flowing under the site is the Carquinez Strait. Infiltration of precipitation, which recharges the flow system, occurs through a thin veneer of silty surficial soil and along fractures and joints within bedrock of the Monterey Group.

20. Depth to groundwater (vadose zone thickness) below the modified-area fill portion of the WMU, in the topographically highest areas of the site, ranges from approximately 68 feet to the northeast to approximately 100 feet to the southwest. Depth to groundwater ranges from approximately 15 feet to 90 feet below ground surface in the canyon fill area of the WMU.

Groundwater

21. There is one well that could possibly be located within one mile of the WMU perimeter. DWR records show one domestic well whose distance from the WMU could range from 0.96 miles to 2.3 miles. Department of Water Resources (DWR) records report one cathodic protection well existing approximately 1.6-1.8 miles from the WMU.

22. Groundwater impacts from the WMU have not been fully characterized, in part due to natural variances in groundwater quality and variances in the structure and lithology of geologic units along the hydraulic gradient at the site. No demonstrated or anticipated major impacts have been identified.

Surface Water

23. The only surface water features identified in the immediate vicinity of the C&H WMU are seasonal seeps and a stream along Cañada del Cierbo and a small intermittent pond

used for stock watering approximately 1200 feet northwest of the site. The stream in Cañada del Cierbo typically exhibits surface water flow only during rainfall events which produce runoff.

24. The mean annual precipitation at the WMU, obtained from a compilation of Contra Costa County Department of Public Works records, is approximately 22 inches. The 100 year, 24-hour storm event is estimated to be 5.9 inches with a runoff volume of 679,000 gallons. The mean annual evapotranspiration determined from pan evaporation data taken at the Martinez weather station is 54 inches.

28. Federal Regulations [40 Code of Federal Regulations (CFR) Parts 122, 123, and 124] require specific categories of construction activities to obtain a National Pollutant Discharge Elimination System (NPDES) permit for storm water discharges. The State Water Resources Control Board has issued a General Permit for Storm Water Discharges Associated with Construction Activities (NPDES Permit No. CAS000002). This facility is subject to these requirements during removal of WMU contents or any other final closure activities. Pursuant to the Storm Water Discharge Program, this facility is required to submit a Notice of Intent for coverage under the General Permit and to prepare and implement a monitoring program. Compliance with this Order is intended to assure compliance with the requirements of the General Permit.

Beneficial Uses

29. The existing beneficial use of the stream in Cañada del Cierbo is:

    a. Wildlife habitat

30. The potential beneficial uses of the ground water in the area are:

    a. Domestic supply
    b. Industrial process and service supply
    c. Agricultural supply

31. This Order requires the excavation and removal of waste at the C&H Sugar WMU in preparation for final closure; therefore, Waste Discharge Requirements Order No. 93-023 is no longer applicable.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

32. The adoption of this order is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21000, et seq.) pursuant to

Section 15321, Title 14 of the California Code of Regulations.

COMMENTS

33. The Board has notified the discharger and interested agencies and persons of its intent to prescribe site cleanup requirements for the closure, and has provided them with an opportunity to submit their written views and comments.

34. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED pursuant to authority in Section 13304 of the California Water Code, the discharger, its agents, successors and assigns may excavate and remove waste at C&H Sugar WMU in preparation for final closure, providing compliance is maintained with regulations adopted under Division 7 of the California Water Code and with the following:

A. PROHIBITIONS

1. The WMU is considered a closed facility. No additional wastes of any origin shall be allowed to be deposited or stored within or upon this site.

2. The discharger, or any future owner or operator of this site, shall not cause the following conditions to exist in waters of the State at any place outside the waste management facility:

   a. Groundwater

      Groundwater quality shall not be degraded as a result of the past waste disposal operation.

   b. Surface Waters

      Floating, suspended, or deposited macroscopic particulate matter or foam.

      Bottom deposits or aquatic growth.

      Adversely alter temperature, turbidity, or apparent color beyond natural background levels.

      Visible, floating, suspended or deposited oil or other products of petroleum origin.

The introduction or increase in concentration of toxic or other pollutants/contaminants which may cause deleterious effects on aquatic biota, wildlife or waterfowl.

B. SPECIFICATIONS

1. All reports submitted pursuant to this Order shall be prepared under the supervision of, signed by and stamped with the seal of a registered professional engineer, registered geologist or certified engineering geologist and shall be acceptable to the Executive Officer.

2. The final site closure activities shall include the excavation of waste material in both the canyon fill and the modified-area fill to the extent necessary to remove all potential threats to water quality. The discharger shall demonstrate, in the **Facility Closure Plan** specified in Provision C.2, how the amount of waste left in place will be minimized.

3. The **Facility Closure Plan** shall include a schedule showing the amount (in tons and cubic yards) of waste that will be removed by the end of each quarter until closure is complete (March 31, June 30, Sept. 30, Dec. 31). **The final deadline for completion of closure activities is October 31, 1998.**

4. During each wet season (October through April) until completion of closure has been certified, the discharger will have soil stabilization structures in place to prevent erosion of sediment from the site. Best Management Practices shall be implemented to reduce or eliminate the sediment load in storm water discharge. At a minimum, sandbag dikes, silt fences, straw bale dikes, or equivalent control practices are required for all significant sideslope and downslope boundaries of the excavation area.

5. STORM WATER MONITORING - During the wet season, the discharger will estimate or calculate the volume of storm water discharge from each outfall and collect and analyze samples of storm water discharge from two storm events during each wet season which produce significant storm water discharge (continuous discharge of storm water for one hour or more). The samples must be analyzed for:

   - pH, total suspended solids (TSS), specific conductance, and total organic carbon (TOC);

6. The discharger shall notify the Regional Board at least **15 business days** prior to beginning any final closure activities. This notice shall include a statement that all

closure activities will conform to the most recently approved closure plan and that the plan provides for site closure in compliance with all applicable regulations.

C. PROVISIONS

1. The discharger shall comply with all Prohibitions, Specifications, and Provisions of this Order, immediately upon adoption of this Order or as provided below.

2. The discharger shall submit a **Facility Closure Plan** that proposes a workplan and schedule for closure of the entire WMU. This report shall include plans for grading and reinforcing the slope of the canyon fill portion and controlling erosion and storm water runoff for the entire WMU.

REPORT DUE DATE: December 13, 1995

3. The discharger shall submit a **Closure Certification Report,** acceptable to the Executive Officer, for the entire WMU documenting completion of closure in accordance with the **Facility Closure Plan** and demonstrating that any waste left in place will not degrade the water quality of the underlying aquifer or the stream in Cañada del Cierbo.

REPORT DUE DATE: December 31, 1998

4. The discharger shall prepare, implement and submit a **Storm Water Pollution Prevention Plan** in accordance with requirements specified in the State Water Resources Control Board General Permit for Storm Water Discharges Associated with Construction Activities (NPDES Permit No. CAS000002).

REPORT DUE DATE: October 1, 1995

5. The discharger shall prepare and submit an **Annual Report** which shall include a summary of visual observations obtained during site inspections and sampling results from the previous two storm water monitoring events.

REPORT DUE DATE: Each July 1 until closure of the WMU has been certified

6. The discharger shall remove and relocate any wastes which are discharged after the date of adoption of this Order in violation of these requirements.

7. The discharger shall maintain a copy of this Order at the site so as to be available at all times to site operating personnel.

8. The discharger shall permit the Board or its authorized representative, upon presentation of credentials:

   a. Immediate entry upon the premises on which wastes are located or in which any required records are kept.

   b. Access to copy any records required to be kept under the terms and conditions of this Order.

   c. Inspection of any treatment equipment, monitoring equipment, or monitoring method required by this Order or by any other California State Agency.

   d. Sampling of any discharge or groundwater governed by this Order.

9. These requirements do not authorize commission of any act causing injury to the property of another or of the public; do not convey any property rights; do not remove liability under federal, state, or local laws; and do not authorize the discharge of wastes without appropriate permits from other agencies or organizations.

10. This Order is subject to Board review and updating, as necessary, to comply with changing State or Federal laws, regulations, policies, or guidelines; changes in the Board's Basin Plan; or changes in the discharge characteristics.

11. Copies of all correspondence, reports, and documents pertaining to compliance with the Prohibitions, Specifications, and Provisions of this Order, shall also be provided to the Environmental Health Services Division, Local Enforcement Agency (LEA), of Contra Costa County.

I, Lawrence P. Kolb, Acting Executive Officer, do hereby certify that the foregoing is a full, complete, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, September 13, 1995.

Lawrence P. Kolb
Acting Executive Officer

Attachments:
Figure 1: Location Map
Figure 2: Facility Layout

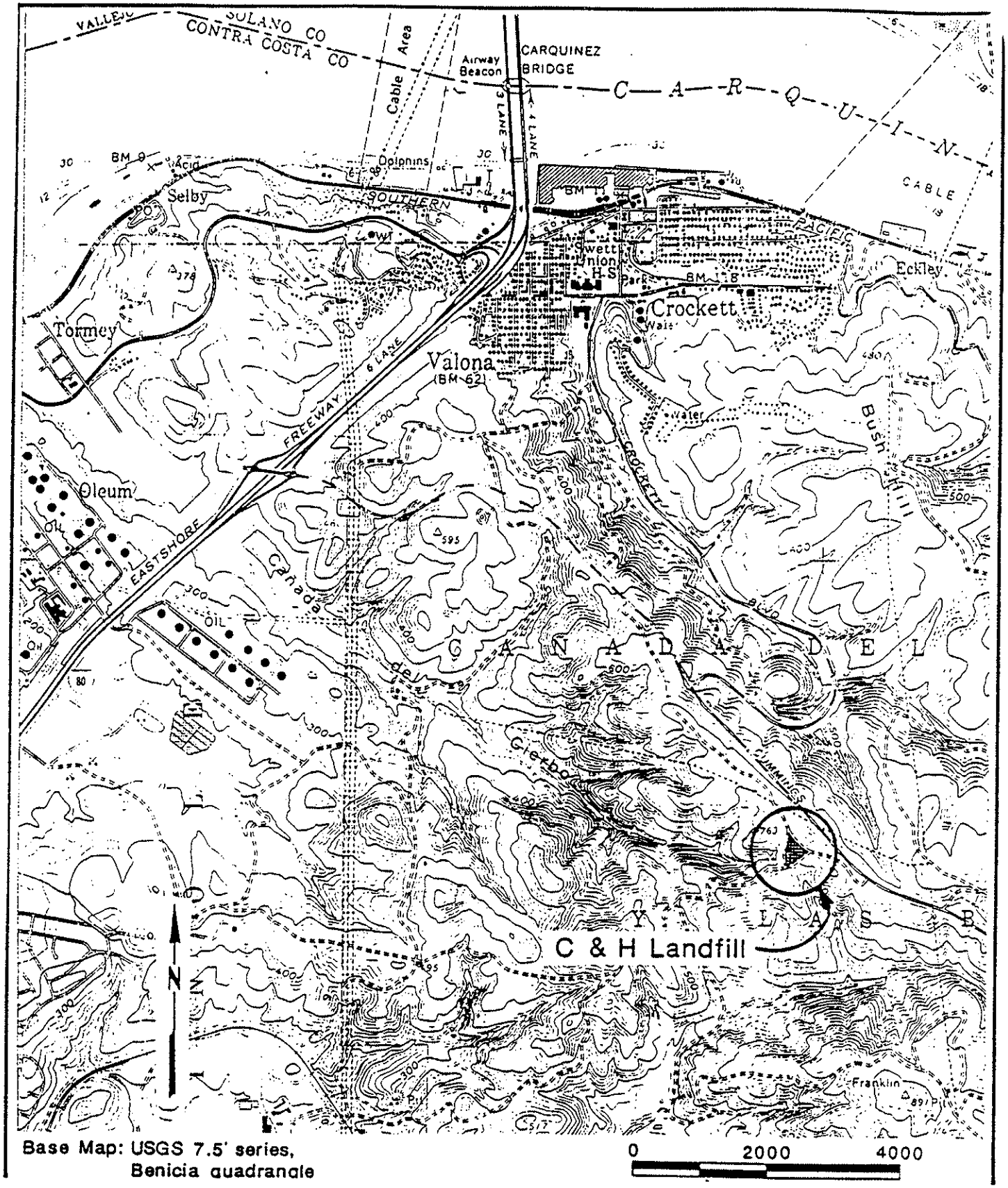

Figure 1. Site Location Map - C&H Sugar Waste Management Unit, Contra Costa County

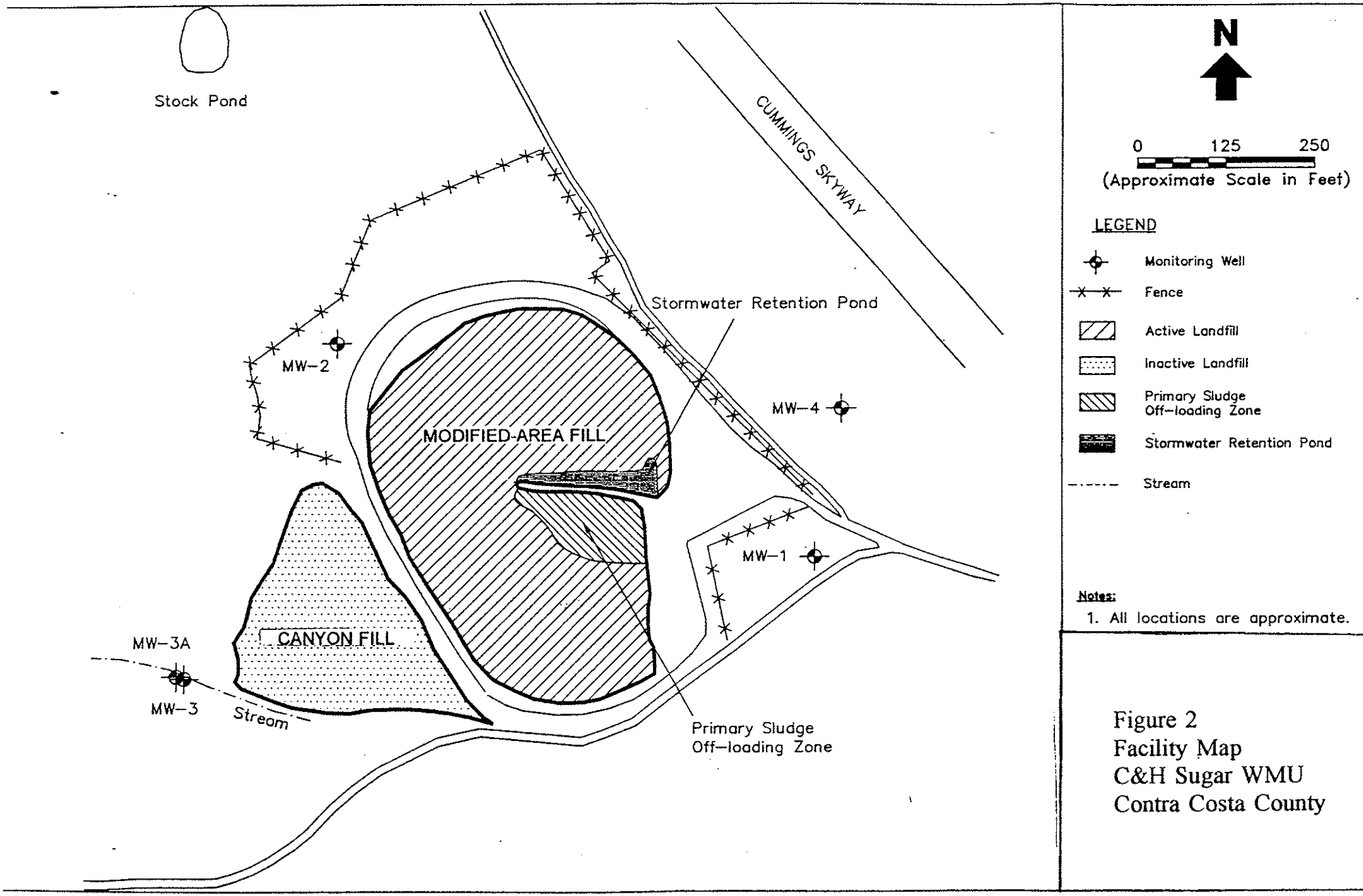

Figure 2
Facility Map
C&H Sugar WMU
Contra Costa County